

CLAIMS

1. A process for producing an oil or a polyunsaturated fatty acid (PUFA), the
5 process comprising:

- (a) deaerating an aqueous liquid comprising cells; and
- (b) obtaining the oil or PUFA from the cells.

2. A process according to claim 1, wherein the cells are microbial cells.

3. A process according to claim 1 or 2, wherein the cells are heated or
10 pasteurised after deaeration in (a) but before stage (b).

4. A process according to any preceding claim, wherein the aqueous liquid
is a fermentation broth.

5. A process according to any preceding claim which further comprises:

- (c) extracting, purifying or isolating the oil or one or more PUFAs.

6. A process according to any preceding claim wherein deaeration
15 comprises:

- a) application of vacuum (or reduced pressure);
- b) mechanical deaeration/de-gassing (stirring, vibration, use of accelerative
or g-force, such as in a centrifuge or a cyclon);
- 20 c) viscosity change (either by dilution with water or other liquid, or by
increase in temperature);
- d) change in fermentation conditions, for example a reduction in airlift, air
sparging or the supply of oxygen or air during fermentation, or a reduction
in stirring rate;
- 25 e) pH change, for example by lowering the pH or acidification;
- f) filtration, for example by using a filter or membrane preferably comprising
an (inert) polymer, for example PTFE;
- g) gas displacement, with an inert gas such as nitrogen, a noble gas such
as helium, or steam;
- 30 h) chemical deaeration, for example using an oxygen scavenger, for
example sodium sulphite or hydrazine;
- i) time, where the aqueous liquid is allowed to rest under conditions such
that oxygen or air diffuses out of the liquid;

or a combination of one or more of the methods in (a) to (i).

7. A process according to any preceding claim wherein the deaeration is effected by reduced stirring and/or gas displacement.

8. A process according to claim 7 wherein gas displacement is performed using a gas comprising either no oxygen or oxygen at a concentration level below atmospheric air.

9. A process according to claim 7 or 8 wherein the gas is, or comprises, nitrogen.

10. A process according to any preceding claim wherein deaeration comprises subjecting the aqueous liquid to reduced pressure.

11. A process according to claim 10, wherein said reduced pressure is a pressure of no more than 800 mbara, preferably no more than 600 mbara.

12. A process according to claim 10 or claim 11, wherein the aqueous liquid is deaerated using a vacuum or degassing pump, a parasol deaerator or an umbrella nozzle.

13. A process according to any preceding claim, wherein deaeration results in an O₂ content in the aqueous liquid of less than 20 ppm, preferably less than 10ppm.

14. A process according to any preceding claim, wherein deaeration results in a concentration of dissolved oxygen of less than 10 ppm, preferably less than 5 ppm, more preferably less than 2 ppm.

15. A process according to any preceding claim, wherein the process comprises subjecting the deaerated aqueous liquid to

(i) a pressure of above 1 bara, preferably above 1.5 bara, more preferably above 2 bara; and/or

(ii) a temperature above 60 °C, preferably above 80 °C, more preferably above 100 °C.

16. A process according to any preceding claim, wherein the cells are heated or pasteurised at a temperature above 80 °C, preferably above 90 °C, preferably above 100 °C.

17. A process according to any preceding claim wherein the PUFA comprises, or oil comprises a PUFA which, is a C18, C20 or C22 Ω -3 or Ω -6 PUFA (optionally ARA, EPA, DHA and/or GLA).

18. A process according to any preceding claim, wherein the cells are yeast, bacterial, fungal or algal cells.

19. A process according to any preceding claim, wherein the oil is a microbial

or single cell oil.

20. A process according to any preceding claim, wherein (b) comprises obtaining an oil comprising a PUFA from the cells, said oil having a POV of less than 12 and/or an AnV of less than 20.

5 21. An oil comprising a PUFA, or a PUFA, obtained by a process according to any preceding claim.

22. An oil according to claim 21, wherein the oil is a microbial or single cell oil.

23. Apparatus for producing an oil or a PUFA from microbial cells,
10 comprising:

(a) means for culturing or fermenting microbial cells;

(b) means for deaerating an aqueous liquid comprising the microbial cells;
and

(c) optionally, means for obtaining the oil or PUFA from the microbial cells.

15 24. Apparatus according to claim 23 wherein (a) comprises a fermenter vessel, (b) comprises a deaerator (optionally able to apply reduced pressure) and/or (c) comprises a homogeniser and/or a centrifuge.

25. Apparatus according to claim 23 or 24 wherein (b) comprises a vacuum or degassing pump, parasol deaerator or umbrella nozzle.

20 26. Apparatus according to any preceding claim, wherein (b) comprises a deaerator able to apply a pressure of less than 800 mbara, preferably less than 600 mbara.